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Amendment dated September 12, 2003
Reply to Office action of March 12, 2003

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-125 (cancelled).

126. (currently amended) A method for forming an interbody spinal implant having an exterior surface with a plurality of bone engaging structures for insertion between adjacent vertebral bodies of a human spine, the method comprising the steps of:

providing the implant comprising a leading end for introduction of the spinal implant into the spine, an opposite trailing end, spaced apart sides therebetween, and a mid-longitudinal axis passing through the leading and trailing ends, opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement toward the bone of one of the vertebral bodies and said opposite lower surface adapted for placement toward the bone of the other of the vertebral bodies when the implant is placed between the adjacent vertebral bodies; and

forming surface projections as part of the upper and lower surfaces of the implant;

at least a first and second two of said surface projections each having a first facet configuration with at least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and said rearward facet having a

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length and a slope, the length of said forward facet being longer than the length of said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, ~~said at least two of said~~ first and second surface projections having opposed side facets between said forward facet and said rearward facet, said side facets having at least a first portion in a plane passing through and being at an angle to the mid-longitudinal axis of the implant, said first and second surface projections each having a peak along a first line that is transverse to the mid-longitudinal axis of said implant; and

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at least a third and fourth of said surface projections each having a second facet configuration with at least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and said rearward facet of said second facet configuration having a length and a slope, the length of said forward facet of said second facet configuration being longer than the length of said rearward facet of said second facet configuration, the slope of said rearward facet of said second facet configuration being steeper than the slope of said forward facet of said second facet configuration, said third and fourth surface projections each having a peak along a second line that is transverse to the mid-longitudinal axis and off-set from the first line transverse to the mid-longitudinal axis, the second facet configuration of the third and fourth surface projections being different from the first facet configuration of the first and second surface projections; said forward facets of said at least two of said surface projections facing the same direction.


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127. (previously presented) The method of claim 126, wherein the step of forming includes one of the sub-steps of grinding, milling, burning, lasering, burnishing, electric discharge machining, broaching, and machining to form said surface projections.

128. (previously presented) The method of claim 126, wherein the steps of providing and forming include the sub-step of casting to form said implant with said surface projections.

129. (previously presented) The method of claim 126, wherein said forming step includes the sub-step of orienting said projections relative to one another to form an array.

130. (previously presented) The method of claim 126, wherein said forming step includes the sub-step of orienting said projections to be geometrically disposed relative to one another.

 Claims 131-206 (cancelled).

207. (previously presented) The method of claim 126, wherein the step of providing the implant includes providing an implant having at least one opening in each of the upper and lower surfaces in communication with one another, the openings being configured to permit for the growth of bone from vertebral body to adjacent vertebral body through the implant.

208. (previously presented) The method of claim 207, further comprising the step of combining the implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

209. (previously presented) The method of claim 207, wherein the step of providing the implant includes providing an implant having an internal chamber between the

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upper and lower surfaces and in communication with the at least one opening in each of the upper and lower surfaces, the internal chamber being adapted to contain bone growth promoting materials.

210. (previously presented) The method of claim 209, further comprising the step of combining the implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

Claims 211-212 (cancelled).

213. (previously presented) The method of claim 126, wherein the step of forming the plurality of surface projections includes using a milling instrument.

214. (currently amended) The method of claim 213 for forming an interbody spinal implant having an exterior surface with a plurality of bone engaging structures for insertion between adjacent vertebral bodies of a human spine, the method comprising the steps of:

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providing the implant comprising a leading end for introduction of the spinal implant into the spine, an opposite trailing end, spaced apart sides therebetween, and a mid-longitudinal axis passing through the leading and trailing ends, opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement toward the bone of one of the vertebral bodies and said opposite lower surface adapted for placement toward the bone of the other of the vertebral bodies when the implant is placed between the adjacent vertebral bodies; and

forming surface projections as part of the upper and lower surfaces of the implant with a milling instrument, at least two of said surface projections each having at

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least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and said rearward facet having a length and a slope, the length of said forward facet being longer than the length of said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, said at least two of said surface projections having opposed side facets between said forward facet and said rearward facet, said side facets having at least a first portion in a plane passing through and being at an angle to the mid-longitudinal axis of the implant, said forward facets of said at least two of said surface projections facing the same direction, wherein the milling instrument includes a cutting tool with a V-shaped profile.

215. (new) The method of claim 214, wherein the step of providing the implant includes providing an implant having at least one opening in each of the upper and lower surfaces in communication with one another, the openings being configured to permit for the growth of bone from vertebral body to adjacent vertebral body through the implant.

216. (new) The method of claim 215, further comprising the step of combining the implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

217. (new) The method of claim 215, wherein the step of providing the implant includes providing an implant having an internal chamber between the upper and lower surfaces and in communication with the at least one opening in each of the upper and lower surfaces, the internal chamber being adapted to contain bone growth promoting materials.

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218. (new) The method of claim 217, further comprising the step of combining the implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

219. (new) The method of claim 214, wherein the forming step includes the sub-step of orienting said projections relative to one another to form an array.

220. (new) The method of claim 214, wherein the forming step includes the sub-step of orienting said projections to be geometrically disposed relative to one another.

221. (new) A method for forming an interbody spinal implant having a plurality of bone engaging structures for insertion between adjacent vertebral bodies of a human spine, the method comprising the steps of:

providing the implant comprising a leading end for introduction of the spinal implant into the spine, an opposite trailing end, and spaced apart sides therebetween, opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement toward the bone of one of the vertebral bodies and said opposite lower surface adapted for placement toward the bone of the other of the vertebral bodies when said implant is placed between the adjacent vertebral bodies; and

forming a plurality of surface projections as part of the upper and lower surfaces of the implant, each of the surface projections having a base, at least two of the surface projections each having at least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and rearward facet being formed to have a length and a slope, the length of said forward facet being longer than the length of said rearward facet, the

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slope of said rearward facet being steeper than the slope of said forward facet, said rearward facet having an included angle between said rearward facet and the base greater than 90 degrees relative to at least one of said upper and lower surfaces of said implant, each of said at least two surface projections being formed to have opposed side facets extending from the base and being directed generally toward said spaced apart sides of the implant, respectively, said side facets being located between said forward facet and said rearward facet of each of said at least two surface projections.

222. (new) The method of claim 221, wherein the step of forming includes one of the sub-steps of grinding, milling, burning, lasering, burnishing, electric discharge machining, and broaching to form said surface projections.

223. (new) The method of claim 221, wherein the steps of providing and forming include the sub-step of casting to form said implant with said surface projections.

224. (new) The method of claim 221, wherein said forming step includes the sub-step of orienting said projections relative to one another to form an array.

225. (new) The method of claim 221, wherein said forming step includes the sub-step of orienting said projections to be geometrically disposed relative to one another.

226. (new) The method of claim 221, wherein said side facets have a maximum width therebetween at the base, the base of at least one of said surface projections being spaced apart from a base of another of said surface projections by a distance no greater than one-half the maximum width of at least one of said at least two surface projections.

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227. (new) The method of claim 221, wherein the step of forming includes forming the forward facets of at least two of said at least two surface projections to face the same direction.

228. (new) The method of claim 221, wherein the step of forming includes forming said side facets of each of said at least two surface projections to converge toward each other in a direction away from the base.

229. (new) The method of claim 221, wherein the step of forming includes forming said at least two surface projections to have substantially the same maximum height from the surface of said implant.

230. (new) The method of claim 221, wherein the step of providing the implant includes providing an implant having at least one opening in each of the upper and lower surfaces in communication with one another, the openings being configured to permit for the growth of bone from vertebral body to adjacent vertebral body through the implant.

231. (new) The method of claim 230, further comprising the step of combining the implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

232. (new) The method of claim 230, wherein the step of providing the implant includes providing an implant having an internal chamber between the upper and lower surfaces and in communication with the at least one opening in each of the upper and lower surfaces, the internal chamber being adapted to contain bone growth promoting materials.

233. (new) The method of claim 232, further comprising the step of combining the

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implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

234. (new) The method of claim 221, wherein the step of forming the plurality of surface projections includes using a milling instrument.

235. (new) The method of claim 234, wherein the milling instrument includes a cutting tool with a V-shaped profile.

236. (new) The method of claim 126, wherein at least a fifth and sixth of said surface projections formed during the step of forming each have a third facet configuration with at least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and said rearward facet of said third facet configuration having a length and a slope, the length of said forward facet of said third facet configuration being longer than the length of said rearward facet of said third facet configuration, the slope of said rearward facet of said third facet configuration being steeper than the slope of said forward facet of said third facet configuration, said fifth and sixth surface projections each having a peak along a third line that is transverse to the mid-longitudinal axis and off-set from the first and second lines, the third facet configuration of the fifth and sixth surface projections being different from the first facet configuration of the first and second surface projections and the second facet configuration of the third and fourth surface projections.

237. (new) The method of claim 126, wherein the step of forming includes forming said forward facets of said first and second surface projections to face the same direction.

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238. (new) The method of claim 126, wherein the step of forming includes forming at least one of the surface projections along the first line to have a maximum height from the surface of the implant that is substantially the same as the maximum height of one of the surface projections along the second line.

239. (new) The method of claim 126, wherein the step of forming includes forming at least three surface projections having the first facet configuration along the first line and forming at least three surface projections having the second facet configuration along the second line.

240. (new) The method of claim 126, wherein the step of forming includes forming at least four surface projections having the first facet configuration along the first line and forming at least four surface projections having the second facet configuration along the second line.

241. (new) The method of claim 126, wherein the step of forming includes forming at least five surface projections having the first facet configuration along the first line and forming at least five surface projections having the second facet configuration along the second line.

242. (new) A method for forming an interbody spinal implant having an exterior surface with a plurality of bone engaging structures for insertion between adjacent vertebral bodies of a human spine, the method comprising the steps of:

providing the implant comprising a leading end for introduction of the spinal implant into the spine, an opposite trailing end, spaced apart sides therebetween, and a mid-longitudinal axis passing through the leading and trailing ends, opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said

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upper surface adapted for placement toward the bone of one of the vertebral bodies
and said opposite lower surface adapted for placement toward the bone of the other of
the vertebral bodies when the implant is placed between the adjacent vertebral bodies;
and

forming surface projections as part of the upper and lower surfaces of the
implant:

at least a first and second of said surface projections each having a first
facet configuration with at least one forward facet directed at least in part toward
the leading end and at least one rearward facet directed at least in part toward
the trailing end, said forward facet and said rearward facet having a length and a
slope, the length of said forward facet being longer than the length of said
rearward facet, the slope of said rearward facet being steeper than the slope of
said forward facet, said first and second surface projections each having a peak
along a first line that is transverse to the mid-longitudinal axis of said implant;
and

at least a third and fourth of said surface projections each having a
second facet configuration with at least one forward facet directed at least in part
toward the leading end and at least one rearward facet directed at least in part
toward the trailing end, said forward facet and said rearward facet of said second
facet configuration having a length and a slope, the length of said forward facet
of said second facet configuration being longer than the length of said rearward
facet of said second facet configuration, the slope of said rearward facet of said
second facet configuration being steeper than the slope of said forward facet of

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said second facet configuration, said third and fourth surface projections each having a peak along a second line that is transverse to the mid-longitudinal axis and off-set from the first line transverse to the mid-longitudinal axis, the second facet configuration of the third and fourth surface projections being different from the first facet configuration of the first and second surface projections.

243. (new) The method of claim 242, wherein the step of forming includes one of the sub-steps of grinding, milling, burning, lasering, burnishing, electric discharge machining, broaching, and machining to form said surface projections.

244. (new) The method of claim 242, wherein the steps of providing and forming include the sub-step of casting to form said implant with said surface projections.

245. (new) The method of claim 242, wherein the forming step includes the sub-step of orienting said projections relative to one another to form an array.

246. (new) The method of claim 242, wherein the forming step includes the sub-step of orienting said projections to be geometrically disposed relative to one another.

247. (new) The method of claim 242, wherein the step of providing the implant includes providing an implant having at least one opening in each of the upper and lower surfaces in communication with one another, the openings being configured to permit for the growth of bone from vertebral body to adjacent vertebral body through the implant.

248. (new) The method of claim 247, further comprising the step of combining the implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

249. (new) The method of claim 247, wherein the step of providing the implant

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includes providing an implant having an internal chamber between the upper and lower surfaces and in communication with the at least one opening in each of the upper and lower surfaces, the internal chamber being adapted to contain bone growth promoting materials.

250. (new) The method of claim 249, further comprising the step of combining the implant with at least one of harvested bone, bone morphogenetic proteins, hydroxyapatite, and genes coding for the production of bone.

251. (new) The method of claim 242, wherein the step of forming the plurality of surface projections includes using a milling instrument.

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252. (new) The method of claim 242, wherein at least a fifth and sixth of said surface projections formed during the step of forming each have a third facet configuration with at least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and said rearward facet of said third facet configuration having a length and a slope, the length of said forward facet of said third facet configuration being longer than the length of said rearward facet of said third facet configuration, the slope of said rearward facet of said third facet configuration being steeper than the slope of said forward facet of said third facet configuration, said fifth and sixth surface projections each having a peak along a third line that is transverse to the mid-longitudinal axis and off-set from the first and second lines, the third facet configuration of the fifth and sixth surface projections being different from the first facet configuration of the first and second surface projections and the second facet configuration of the third and fourth surface projections.

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253. (new) The method of claim 242, wherein the step of forming includes forming said forward facets of said first and second surface projections to face the same direction.

254. (new) The method of claim 242, wherein the step of forming includes forming at least one of the surface projections along the first line to have a maximum height from the surface of the implant that is substantially the same as the maximum height of one of the surface projections along the second line.

255. (new) The method of claim 242, wherein the step of forming includes forming at least three surface projections having the first facet configuration along the first line and forming at least three surface projections having the second facet configuration along the second line.

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256. (new) The method of claim 242, wherein the step of forming includes forming at least four surface projections having the first facet configuration along the first line and forming at least four surface projections having the second facet configuration along the second line.

257. (new) The method of claim 242, wherein the step of forming includes forming at least five surface projections having the first facet configuration along the first line and forming at least five surface projections having the second facet configuration along the second line.
